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Thermoelectric power factor under the effect of 1-D quantum confinement I-JU CHEN, LUNA NAMAZI, KIMBERLY DICK THELANDER, HEINER LINKE, CLAES THELANDER, Lund Univ/Lund Inst of Tech — Semiconductor nanowires hold great promises for achieving high thermoelectric efficiencies both by reducing the thermal conductivity and increasing the power factors. One way to increase the power factor is by taking advantage of the 1D quantum confinement effect. However, up to date, it is not clear whether this is feasible in nanowire structures. In this work we study experimentally the thermoelectric properties of InAs single-nanowire devices. Conductance quantization and the associated oscillations of the Seebeck coefficient are observed, indicating that the electronic transport is dominated by 1-D quantum confinement. Thermoelectric characterization is performed from the 1st up to the 4th subband. To understand quantum effects on the power factor, we investigated devices with lengths ranging from the ballistic to the diffusive regime, at temperatures between 10 and 295 K. By drawing an analogy with ballistic 1-D conductors, we analyze the maximal power factors achievable with a single 1-D subband.

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